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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF SHELBURNE

COUNTY OF DUFFERIN

1966

VILLAGE OF SHELBURNE 1966
COUNTY OF DUFFERIN

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Report of a water pollution survey of the village of Shelburne, county of Dufferin.

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REPORT

of a

Water Pollution Survey

of the

VILLAGE OF SHELBURNE

County of Dufferin

May 1966

The Division of Sanitary Engineering

VILLAGE OF SHELBURNE

WATER POLLUTION SURVEY

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R E P O R T

THE ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

This report is concerned with the assessment of water quality within the Village of Shelburne. Surveys of this nature are made by the Ontario Water Resources Commission for the purposes of recording the general conditions of the water resources within a municipality by locating and recording sources of existing and potential water pollution. Where these sources are noted, recommendations concerning their abatement are made to the parties concerned. Where pollution problems are of a municipal nature, the OWRC advises municipalities concerning their needs for sewage treatment and disposal and is equipped to construct, finance, and operate water and sewage works for Ontario municipalities upon request.

On May 11, 1966, surface water samples were collected from drainage courses within the municipality and any known discharges thereto. In addition, accumulated sample results such as those from the municipal sewage works system which may assist in evaluating water pollution conditions are recorded.

GENERAL

Location

The Village of Shelburne has an assessed population of 1,302. It is located at the junction of Highways 10 and 24 approximately at the geographic centre of the County of Dufferin.

The municipality lies in fairly undulatory terrain. Overburden consists of sand and clay in depths which may vary from 30 to 100 feet with an underlying rock formation of limestone and shale.

Drainage

Shelburne is situated on the watershed of the Nottawasaga River. A small tributary flows through the south-easterly fringe area of the village and continues in a northerly direction for some two miles to its confluence with the Boyne River. The Boyne River flows easterly to the Nottawasaga River which in turn empties into Georgian Bay near Wasaga Beach.

Separate sewer systems are utilized. The storm sewers are discharged to the tributary; two main outfalls being located where the watercourse crosses Highway 10 at the east end of the village. The municipal waste stabilization pond effluent flows to the stream near the north limit of the municipality.

The stream sampling points are generally designated by using the first letter of each of the associated watercourses and the approximate mileage from the mouth of the main watercourse, the Nottawasaga River.

Expansion

A certain amount of expansion expected within the municipality will create an increased demand for use of water and sewage facilities. A new 21-room area public school is to be built just east of the corporation limit and will be connected to the 6-inch water main and

10-inch sanitary sewer serving the area. A five room addition to the high school is also planned.

An area in the north-eastern section of the village is designated as an industrial park, and will require extended services by the municipality in the event of the settlement of new industry at this location.

WATER USES

Municipal Water Works

Water is obtained from two deep wells which are used alternately at monthly or bi-monthly intervals. Two centrifugal pumps rated at 250 gpm and 275 gpm respectively pump water untreated to the system. Storage is provided by a 200,000 gallon elevated steel tank.

For all practical purposes, 100 per cent of the village is served by municipal water. A plan of the water works system showing the area serviced is being prepared by the village's consulting engineers. The following service connections are provided:

Industrial or Commercial	-	128
Private	-	496
Total	-	624

During 1965, a total of 37,874,200 gallons of water was pumped representing an average daily per capita consumption of 80 gallons.

The water is hard and relatively high in iron content. The natural fluoride content present approximately equals the recommended

1.0 ppm concentration for artificial fluoridation. Generally satisfactory bacteriological quality of the water has been indicated during the past.

Private Water Systems

One private well known as the railroad well is utilized by two or three private dwellings.

Industrial Water Supply

Apparently, all of the industries within the village use municipal water only.

Recreational Use

Municipal water is used in the local swimming pool.

The watercourse flowing through the village is not of sufficient size for swimming.

WATER POLLUTION

Municipal Waste Stabilization Lagoon

General

Treatment of sanitary sewage is provided by the municipal waste stabilization lagoon. This water pollution control system was established in 1962 in a joint project between the Village of Shelburne and the OWRC; the operation of the system is carried out under the supervision of the OWRC Division of Plant Operations.

Sewage from the village flows by gravity to a pumping station where it is directed to the lagoon through a forcemain. The lagoon consists of two cells with a combined area of 13.16 acres which

can be operated in series or parallel. The effluent is discharged to the aforementioned Boyne River tributary.

Future provision has been made to allow for expansion of the system with the addition of another cell to the lagoon.

Treatment Efficiency

The following is a summary of certain samples collected to date which indicate the efficiency of the treatment of the raw sewage.

	Raw Sewage		Treated Effluent		Per Cent Removal	
	BOD	SS	BOD	SS	BOD	SS
1963 (4 samples)						
Minimum	210	197	14	62		
Maximum	265	1126	114	74		
Average	246	499	47	84	80.7	76.9
1964 (4 samples)						
Minimum	220	394	32	94		
Maximum	510	1110	82	258		
Average	342	562	50	163	85.0	71.0
1965 (4 samples)						
Minimum	94	139	12	23		
Maximum	650	1090	33	69		
Average	261	396	18	47	93.0	88.0
1966 (5 samples) to date						
Minimum	100	180	11	20		
Maximum	260	368	74	142		
Average	201	245	36	74	82.0	70.0

It can be noted from the above that reductions have varied from 80 to 93 per cent for BOD and 70 to 88 per cent for suspended solids. This is fairly normal for this type of treatment facility; however, the average BOD and suspended solids in the final effluent are

slightly high. On May 10, 1966, a heavy algae growth was noted in the stream, downstream from the outfall; the sample results also indicate some impairment of the stream. It has been recommended that if the effluent cannot be improved, alternate measures such as retaining the effluent during low flow periods in the watercourse should be considered.

Municipal Storm Sewers

General

The two main storm sewers serving the village extend along Main Street (Highway 10) and discharge to the Boyne River tributary where it crosses the highway at the east end of Shelburne. Another storm sewer discharges to the tributary at the junction of Victoria Street and the CPR railway track.

Pollution Sources

Sample point NBSH 76.1-W(N) is a storm sewer outfall to the tributary on the north side of Highway 10. The excessive coliform count in the sample obtained from this point indicates the presence of domestic wastes in the discharge.

Sample point NBSH 76.1-W(S) is a storm sewer discharge to the tributary on the south side of Highway 10. The presence of sanitary wastes was visually evident in this discharge. This is supported by the sample results.

Sample point NBSH 76.71-W is a storm sewer discharge to the tributary at the junction of Victoria Street and the CPR railway

tracks. A fairly high coliform count and a BOD slightly in excess of OWRC objectives for surface water were obtained in samples collected from this point indicating that some contamination may be occurring.

Industry

The following industries are located in the village:

Name of Industry	Product
Canada Packers Limited	Butter
Hammer Pump Works	Air pumps
McCaul Knitting Mills	Wool
J.W. Robinson	Lumber and building supplies

Liquid industrial and/or sanitary wastes originating from these industries are discharged to the sanitary sewer system.

Refuse Disposal

The village refuse disposal site is located in the north-eastern section of the municipality near the access road to the waste stabilization lagoon. The operation of this site does not appear to present any problems associated with water pollution.

General Discussion of Laboratory Results

It was evident that deterioration of stream quality occurs as it passes through the village. At sample point NBSH 76.71 which is the upstream sampling point, counts well within surface-water objectives were noted. The samples collected over the past four years from the point where the watercourse crosses Highway 10 have consistently shown excessive coliform counts which are undoubtedly due to the contaminated storm sewer discharges. Likewise the BOD values in excess of the

the objectives in samples collected downstream at Highway 24 reflect the influence of these discharges as well as the municipal waste stabilization lagoon discharge. A heavy algae growth downstream from the municipality is occurring as the result of these discharges providing favourable conditions for such a growth. The stream draining the swampy area north of First Avenue and discharging to the watercourse does not appear to be impaired to any great extent.

SUMMARY

This is a report of a water pollution survey of the Village of Shelburne, the purpose of which is to locate and record any existing and potential sources of water pollution within the municipality. The report is based on water samples collected on May 11, 1966, as well as other accumulated information.

The village is served by municipal water and sewage disposal systems. A separate storm drainage system is provided. A small watercourse which is a tributary of the Boyne River flows through a fringe area of the village. Pollution of this watercourse is occurring as a result of at least two municipal storm sewer discharges and the discharge from the waste stabilization lagoon.

A recommendation concerning the sewage treatment facilities has been made. No industrial waste pollution is noted.

RECOMMENDATION

The necessary measures should be taken by village officials to exclude any contaminated wastes from the storm sewers.

Alternative methods for discharging the municipal waste stabilization lagoon effluent to the watercourse should be considered.

/elc

Approved by _____

C.E. McIntyre, P.Eng.,
District Engineer,
Div.of Sanitary Engineering.

Prepared by: M.M. Holy,
Engineering Technician.

EXPLANATION AND SIGNIFICANCE OF LABORATORY ANALYSES

A Bacteriological Examination

Bacteriological examinations were performed on samples from the watercourse. The Membrane Filter technique was used to obtain a direct enumeration of coliform organisms. These organisms are normal inhabitants of the intestines of man and other warm blooded animals. They are always present in sewage and are generally minimal in other pollutants. The results of the examinations are reported as M.F. Coliform count per 100 ml.

The Commission's objective for surface waters in Ontario is a coliform count of not greater than 2,400 organisms per 100 ml.

B Chemical Analysis

The chemical analysis performed on stream and outfall samples included determinations for biochemical oxygen demand and suspended solids.

(1) Biochemical Oxygen Demand (BOD)

Biochemical oxygen demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for stabilization of decomposable organic matter present in sewage, polluted waters or industrial wastes. The completion of the test requires five days, under the controlled incubation temperature of 20°C.

The Commission's water quality objectives are (1) for stream water - a 5-Day BOD of not greater than 4 ppm (II) for storm sewer, water pollution control plant and industrial waste discharges -

a 5-Day BOD of not greater than 15 ppm.

(2) Solids

The laboratory does tests to determine the total and suspended solids in a sample. The value for dissolved solids is determined by taking the mathematical difference between the total and suspended solids.

The concentration of suspended solids expressed in parts per million (ppm) is generally the most significant of the solids analyses in regard to stream water and outfall discharge qualities.

The OWRC's objective for discharge is a suspended solids concentration of not greater than 15 ppm.

TABLE I

VILLAGE OF SHELBURNE

WATER POLLUTION SURVEY

SAMPLE RESULTS

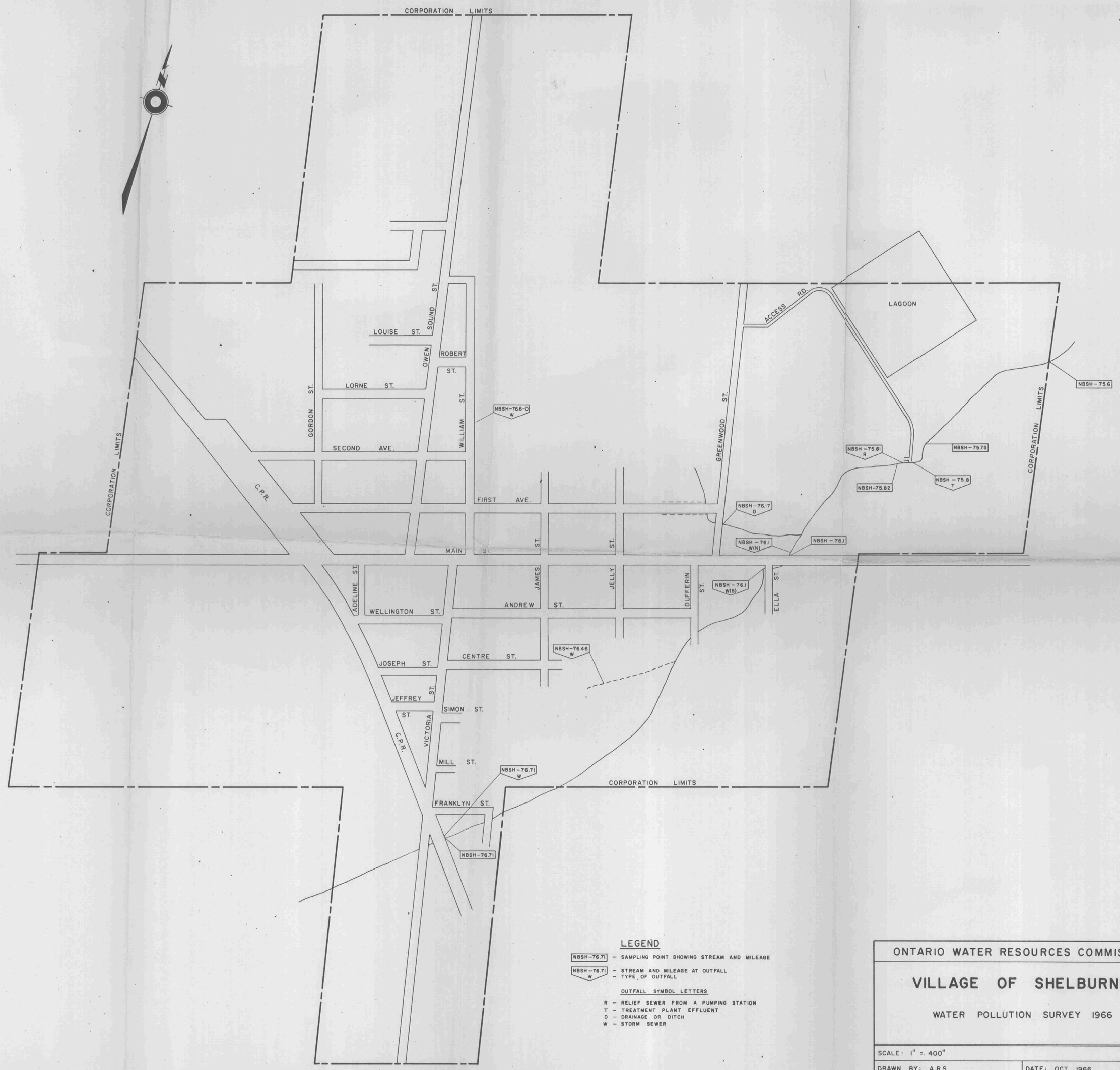
Sampling Point No.	Description	Date	5-Day BOD (ppm)	Total (ppm)	Susp. (ppm)	Diss. (ppm)	Nitrates as N	Phosphorous as PO_4	M.F.Colifor Count per 100 ml
NBSH 75.6	Shelburne Branch of Boyne R.at Hwy. 24.	May 23/66	5.3	488	-	-			
		Sept.15/65	4.2	532	10	522			
		May 11/66	8.2	516	23	493			180
NBSH 75.75	Shelburne Branch of Boyne R.250 ft. downstream from Shelburne lagoon outfall.	May 11/66	8.4	546	29	517	1.10	2.80	11,000
NBSH 75.8-T	Shelburne lagoon effluent outfall.	May 10/66	31	556	142	414			6,900
NBSH 75.81-R	Overflow from sewage pumping station.	May 11/66	No Flow						
NBSH 75.82	Shelburne Branch of Boyne R.100 ft. upstream from Shelburne lagoon outfall.	May 11/66	1.4	526	3	523	1.80	0.42	9,000

TABLE I (CONT.)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	M.F. Coliform Count per 100 ml
NBSH 76.1	Shelburne Branch of Boyne R.at Hwy. 10 east end of village.	Oct.16/62	44	680	67	613	159,000
		May 23/63	3.5	450	-	-	12,900
		Sept.15/65	-	-	-	-	600,000
		May 11/66	2.2	614	5	609	105,000
NBSH 76.1-W (N)	Storm sewer outfall to Shelburne Branch at Hwy. 10-north side.	May 11/66	3.6	724	7	717	2,900,000
NBSH 76.1-W (S)	Storm sewer outfall to Shelburne Branch at Hwy. 10-south side.	May 11/66	10	930	14	916	84,000
NBSH 76.17-O	Small watercourse flowing to Shelburne Branch of Greenwood Street.	May 11/66	1.4	476	4	472	6
NBSH 76.6-D-W	Sewer outfall to swamp area near William St.and Second Avenue.	May 11/66	No Flow				
NBSH 76.46-W	Storm sewer outfall to ditch at Centre Street.	May 11/66	Not Located				
NBSH 76.71-W	Sewer outfall to Shelburne Branch-east side of CPR tracks.	May 11/66	4.4	1210	11	1199	52,000

TABLE I (CONT.)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids			M.F.Coliform Count per 100 ml
				Total (ppm)	Susp. (ppm)	Diss. (ppm)	
NBSH 76.71	Shelburne Branch of Boyne R. at CPR tracks - Shelburne.	May 11/66	1.2	436	3	433	540



LEGEND

NBSH-76.71 – SAMPLING POINT SHOWING STREAM AND MILEAGE

NBSH-76.71 W – STREAM AND MILEAGE AT OUTFALL – TYPE OF OUTFALL

OUTFALL SYMBOL LETTERS

R – RELIEF SEWER FROM A PUMPING STATION
T – TREATMENT PLANT EFFLUENT
D – DRAINAGE OR DITCH
W – STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

VILLAGE OF SHELBURNE

WATER POLLUTION SURVEY 1966

SCALE: 1" = 400'	
DRAWN BY: A.R.S.	DATE: OCT., 1966
CHECKED BY:	DRAWING Nº: 66-71